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"Droppers" of Tulipa and Erythronium.—Miss ROBERTSON¹⁵ has been investigating the peculiar descending stolons of Tulipa and Erythronium, which are called "droppers" by the gardeners. In her account she makes no mention of the work of RIMBACH,¹⁶ one of whose papers contains quite an extended account of the "droppers" of Erythronium, and the other deals with a number of genera of the Liliaceae. The summary states that "the power of lateral migration to prevent overcrowding, and of descent into the soil for protection against frost, drought, and animals, is possessed in some degree by many bulbous plants." The statement includes a fact and its purpose; the former seems evident, the latter would be somewhat difficult to demonstrate. The power referred to is said to be more highly specialized in Tulipa and Erythronium than usual, and hence the structure and behavior of the so-called "droppers" is of special interest. "The immature bulb each year produces a single foliage leaf, continued at the base into a hollow tube, the 'dropper,' enclosing a bulb at its tip." It seems to be a distinct device for distributing bulbs; and the testimony of anatomy is that the "dropper" is partly axial and partly foliar.—J. M. C.

Laws of heredity classified.—DARBISHIRE¹⁷ draws a careful distinction between the several so-called laws of inheritance now under discussion among biologists. He classifies them as statistical and physiological according as they are descriptive and deal with mass-results on the one hand, or as they are explanatory and deal with individuals on the other. He places GALTON'S and PEARSON'S laws in the former category, and Mendelism and the law of diminishing contribution in the latter. By the law of diminishing contribution he designates the view generally held that an individual inherits more or less from all his ancestors, but less from the more remote than from the more recent. It is maintained that Mendelism is not to be considered alone as a theory, but also as a method, and that new details of theory which are worked out by the Mendelian method are as much a part of Mendelism as is the original statement made by MENDEL. An experiment is outlined which is calculated to test simultaneously the truth both of GALTON'S and of MENDEL'S laws, and it is pointed out that the former is true of masses and the latter of individuals.—GEO. H. SHULL.

Radial growth of tree-trunks.—LIGNIER¹⁸ has been investigating the growth of trees in diameter, following a suggestion made A. DE CANDOLLE in his *Physiologie végétale* (1832) that if there could be made a very large number of observations of individuals of the same species, an approximate formula of increase

¹⁵ ROBERTSON, AGNES, The "droppers" of Tulipa and Erythronium. *Annals of Botany* 20: 429-440, pls. 31-32. 1906.

¹⁶ BOT. GAZETTE 30:171-188. pl. 13. 1900; 33:401-420. pl. 14. 1902.

¹⁷ DARBISHIRE, A. D., On the difference between physiological and statistical laws of heredity. *Mem. and Proc. Manchester Lit. Phil. Soc.* 50 (no. 11): 44. 1906.

¹⁸ LIGNIER, O., Notes sur l'accroissement radial des troncs. *Bull. Soc. Linn. Normandie* V. 9:181-224. 1905.

might be established for each species. and it would be possible to estimate with some degree of accuracy the age of a tree from its diameter. From this standpoint LIGNIER has investigated *Quercus pedunculata*, *Castanea vulgaris*, *Sophora japonica*, and *Taxus baccata*; and in a less complete way *Sequoia gigantea*, *Cedrus Deodora*, and *Araucaria imbricata*. There are three distinct periods in the rate of diameter increase: (1) the period of acceleration; (2) the period of decline; (3) the final period in which diameter increase is barely perceptible. *Quercus* begins its final period at about 140 years, when the radius is 57.9 cm; *Castanea* at 190 years, with a radius of 74.7 cm; *Taxus* at 150 years, with a radius of 25.6 cm. For each of the species investigated there is a table which gives the age in terms of the radius.—J. M. C.

Cytology of the Entomophthoraceae.—The preliminary announcement of RIDDLE's results was noted in this journal.¹⁹ The full paper has now appeared,²⁰ *Empusa Grylli* and several species of Entomophthora were investigated, and the writer reaches conclusions somewhat different from those of OLIVE.²¹ The nucleus is well developed, there being a chromatin nucleolus surrounded by chromatin granules. At division there is a well-developed mitosis, in which, however, the chromosomes are formed by a direct aggregation of chromatin granules without the formation of a spirem. The spindle is intranuclear, bipolar, and without centrosomes. The conidia of *Empusa* are multinucleate and those of Entomophthora uninucleate. The zygospores of Entomophthora are formed by the fusion of multinucleate hyphal bodies. In *Empusa* the zygospores are formed by the budding out of a hyphal body. Cytological evidence favors the derivation of the Entomophthoraceae from a Mucor-like ancestry.—CHARLES J. CHAMBERLAIN.

Parthenogenesis in Wikstroemia.—WINKLER's preliminary paper was reviewed in this journal,²² and now the completed results have been published.²³ The present investigation shows that the embryo develops from the egg without fertilization, but whether the egg contains the sporophyte number of chromosomes (52) or the gametophyte number (26) was not determined definitely. It is probable that the egg has the sporophyte number of chromosomes. WINKLER proposes the phrase *somatic parthenogenesis* for cases in which the embryo develops from an egg with the sporophyte number of chromosomes, and *generative parthenogenesis* for cases in which the number has been reduced. He insists that an egg is an egg whether it has the reduced number of chromosomes or not. The

¹⁹ BOT. GAZETTE 42:236. 1906.

²⁰ RIDDLE, LINCOLN, W., On the cytology of the Entomophthoraceae. Proc. Amer. Acad. 42:177-197. pls. 1-3. 1906.

²¹ BOT. GAZETTE 41:192-205, 229-259. 1906.

²² BOT. GAZETTE 39:236. 1905.

²³ WINKLER, HANS, Ueber Parthenogenesis bei *Wikstroemia indica*. Ann. Jard. Buitenzorg II. 5:208-276. pls. 20-23. 1906.